

CLAIMS

1. An apparatus comprising:

a first circuit configured to receive a first reference signal and generate a second reference signal, wherein a frequency and a phase of said second reference signal are (i) adjusted in response to said first reference signal and (ii) held when said first reference signal is lost; and

5 a second circuit configured to generate one or more output signals in response to said second reference signal and one of said one or more output signals, wherein said one or more output signals have a controlled and/or substantially zero delay with respect to said first reference signal.

10 2. The apparatus according to claim 1, wherein said first circuit comprises:

15 a control circuit configured to generate a control signal in response to said first and second reference signals, wherein said control signal is held when said first reference signal is lost; and

20 an oscillator configured to generate said second reference signal in response to said control signal.

3. The apparatus according to claim 1, wherein said second circuit comprises:

a phase locked loop (PLL) circuit configured to generate a clock signal in response to said second reference signal and said 5 one of said one or more output signals; and

a buffer circuit configured to generate said one or more output signals in response to said clock signal.

4. The apparatus according to claim 3, wherein said second circuit further comprises a divide-by-N circuit configured to divide said one of said one or more output signals.

5. The apparatus according to claim 3, wherein said PLL circuit comprises an analog PLL circuit.

6. The apparatus according to claim 1, wherein said first circuit comprises a digitally controlled reference loop circuit.

7. The apparatus according to claim 2, wherein said oscillator comprises a voltage controlled crystal oscillator (VCXO).

8. The apparatus according to claim 2, wherein said oscillator is an oscillator selected from the group consisting of voltage controlled oscillators (VCOs), current controlled oscillators (ICOs), digitally controlled oscillators, digitally controlled crystal oscillators, LC oscillators, RC oscillators, and ring oscillators.

9. The apparatus according to claim 1, wherein said first reference signal comprises an external timing signal.

10. The apparatus according to claim 5, wherein said first circuit further comprises a phase detector circuit configured to adjust a phase of said second reference signal in response to said first and second reference signals.

11. The apparatus according to claim 1, wherein said first circuit further comprises a divide-by-N circuit configured to divide a frequency of said first reference signal.

12. The apparatus according to claim 1, wherein said apparatus is implemented on a single integrated circuit chip.

13. An apparatus for generating one or more output signals comprising:

means for receiving a first reference signal and generating a second reference signal, wherein a frequency and a phase of said second reference signal are (i) adjusted in response to said first reference signal and (ii) held when said first reference signal is lost; and

means for generating said one or more output signals in response to said second reference signal and one of said one or more output signals, wherein said one or more output signals have controlled and/or substantially zero delay with respect to said first reference signal.

14. A method of generating one or more output signals comprising the steps of:

(A) receiving a first reference signal and generating a second reference signal, wherein a frequency and a phase of said second reference signal are (i) adjusted in response to said first

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reference signal and (ii) held when said first reference signal is lost; and

10 (B) generating said one or more output signals in response to said second signal and one of said one or more output signals, wherein said one or more output signals have controlled and/or substantially zero delay with respect to said second reference signal.

15. The method according to claim 14, wherein said second reference signal is phase locked to said first reference signal.

16. The method according to claim 14, wherein step A further comprises the step of dividing said first reference signal by N.

17. The method according to claim 14, wherein step A comprises the step of generating said second reference signal using a digitally controlled reference loop circuit.

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18. The method according to claim 17, wherein step A further comprises the step of adjusting a phase of said second reference signal in response to said first and second reference signals.

19. The method according to claim 14, wherein said first reference signal comprises an external timing signal.

20. The apparatus according to claim 14, wherein said second reference signal comprises a crystal oscillator signal.